PHIL 265 – Philosophy of Science

Winter Term 2012

Mon Wed Fri 10:00–10:50 pm, ED 107

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Webpage at   https://eclass.srv.ualberta.ca

A. Course overview and aims

What is science? What distinguishes science from pseudoscience? Are there certain methods that scientists use and which ensure that science arrives at objective results? Does scientific knowledge grow in a progressive fashion in the course of history? Do scientists have good reasons to abandon old ideas and replace them with novel theories, or are scientific theories maintained only by the social power of a group of scientists?

This class is an introduction to the philosophy of science. We shall take a look at several answers to the above questions by discussing the most prominent accounts of the nature of science. We will critically examine different attempts to define the 'scientific method', to draw a line dividing science from pseudo-science, and to justify the high status and reliability generally accorded to scientific knowledge. Substantial attention will be given to the relationship between evidence and theory. We will also see why a study of scientific practice and the history of science is essential to answering questions about the nature of science.

The course will convey different concepts and positions from the philosophy of science. Students who successfully complete the course will be able to
- apply these philosophical concepts to cases from science and examples from the history of science, and
- to compare and critically examine different philosophical positions about the nature of science.

In addition to the possibility of a major or minor in Philosophy, I would like to draw your attention to the university's interdisciplinary Program in Science, Technology and Society (http://www.ois.ualberta.ca/sts.cfm). The program offers a major and a minor, and this class is one of the many courses you can count toward these degrees.

B. Prerequisites

There are no formal prerequisites for this class, and it is designed to be accessible to those with no background in either philosophy or science.

C. Required texts

Alan F. Chalmers, *What Is This Thing Called Science?* Hackett Publishing Company. 3rd edition, 1999. [Available at the UoA bookstore in the SUB. If you get it from somewhere else, make sure to get this edition. The older editions (white cover) do not contain important chapters.]

D. Course requirements

- o   Midterm   20%
- o   Final   30%
- o   Homework   40%
- o   Participation   10%

Midterm exam (20%): The midterm on **March 9** will consist of multiple choice questions and possibly some short answer questions. The midterm covers the material up to (and including) Thomas Kuhn on paradigm shifts.

Final exam (30%): The final on **April 23** will consist of multiple choice questions and possibly some short answer questions. While emphasis will be placed on material covered in the second half of the course, the final will be cumulative.

Homework exercises (40%): Ten homework exercises will be set in total (usually about one page to write). Each homework question will be posted on our course website, and assignments have to be turned in at the beginning of class. Due dates are listed on the schedule in Section F. Although you will receive feedback on it, Homework 1 will be ungraded. It is still compulsory, since a later homework will ask you to comment on what you wrote in Homework 1. Among the nine graded exercises (Homework 2 to 10), the lowest grade will be discarded, so that each homework counts 5% towards your final grade.

Participation (10%): Attendance and active participation is important for this class. Some classes include discussion or in-class exercises. It is the responsibility of each student to come to class prepared to ask questions, make comments, or actively engage in discussion. You can also obtain participation credit by starting topics and contribute to existing discussions at the discussion forum on our website.

When assigning final grades at the end of the term based on your performance on the above requirements, I will ensure that the grade distribution of this class does not deviate too much from the overall university distribution, taking into account the overall workload of this course and the difficulty of the material.

E. Course website

The course has a website at https://eclass.srv.ualberta.ca. I use this site to post homework questions, lecture slides, study guides, and your grades. The site also contains a discussion board.

F. Schedule of classes

Jan 9 – 13	**The hypothetico-deductive method** Chalmers, Introduction and Chapter 1	
Jan 16 – 20	**The problem of induction** Chalmers, Chapter 4	Mon: Homework 1 due
Jan 23 – 27	**Karl Popper: Falsificationism** Chalmers, Chapter 5	Mon: Homework 2 due
Jan 30 – Feb 3	**Karl Popper con't. Theory, observation, and experiment** Chalmers, Chapters 7	Mon: Homework 3 due
Feb 6 – 10	**Theory, observation, and experiment con't** Chalmers, Chapters 2–3	Mon: Homework 4 due
Feb 13 – 17	**Thomas Kuhn: Paradigm shifts and scientific revolutions** Chalmers, Chapter 8	Mon: Homework 5 due

Reading Week

Feb 27 – Mar 2	**Thomas Kuhn con't. Imre Lakatos: Defending falsificationism** Chalmers, Chapter 6	Mon: Homework 6 due
Mar 5 – 9	**Imre Lakatos: Defending falsificationism con't** Chalmers, Chapters 9 **MIDTERM EXAM: Friday, March 9**	
Mar 12 – 16	**Paul Feyerabend: Is there really a scientific method?** Chalmers, Chapter 10	Wed: Homework 7 due
Mar 19 – 23	**Sociological aspects of science** Chalmers, Chapter 11	Wed: Homework 8 due
Mar 26 – 30	**The probabilistic confirmation of theories** Chalmers, Chapter 12	Wed: Homework 9 due
Apr 2 – 4	**The probabilistic confirmation of theories con't.** (Fri: Good Friday)	Wed: Homework 10 due
Apr 11 – 13	**The nature of science.** (Mon: Easter Monday) Apr 13: Review for the final	

Apr 23	**FINAL EXAM: Monday, April 23, 9:00–11:00 am**

G. Academic integrity and plagiarism

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards and to uphold the policies of the university in this respect. Students are urged to familiarize themselves with the Code of Student Behaviour (http://tinyurl.com/CodeofStudentBehaviour) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the university. For a summary please see
http://www.governance.ualberta.ca/en/StudentAppeals/DontCheatsheet.aspx

The Code of Student Behaviour defines plagiarism as follows:

> No Student shall submit the words, ideas, images or data of another person as the Student's own in any academic writing, essay, thesis, project, assignment, presentation or poster in a course or program of study.

The library has a general website on plagiarism: http://www.library.ualberta.ca/guides/plagiarism. See in particular the section on "Avoiding Plagiarism" (sidebar on the left, among "Resources for Students").

H. Useful further literature

Godfrey-Smith, P. (2003) *Theory and Reality: An Introduction to Philosophy of Science.* University of Chicago Press. [Accessible and good overview of the major issues in philosophy of science.] Q 175 G596 2003

Okasha, S. (2002) *Philosophy of Science: A Very Short Introduction.* Oxford University Press. [Indeed a short introduction.] Q 175 O4555 2002

Hacking, I. (1983) *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science.* Cambridge University Press. [Classical introduction to the philosophy of science, focusing on issues surrounding realism.] Q 175 H1213 1983

Kuhn, T. S. (1970) *The Structure of Scientific Revolutions.* 2nd edition. University of Chicago Press. [One of the most frequently cited 20th century books. Kuhn's account will figure prominently in our class. Originally published in 1962, the 2nd edition contains a postscript where Kuhn replies to critiques and misinterpretations of his account.] Q 175 K95 1970

Salmon, M. H. et al. (1992) *Introduction to the Philosophy of Science: A Text by Members of the Department of the History and Philosophy of Science of the University of Pittsburgh.* Prentice Hall. [Collection of articles summarizing the main issues, arguments, and positions in the philosophy of science.] Q 175 I633 1992

Curd, M. and Cover, J. A. (1998) *Philosophy of Science: The Central Issues.* Cambridge University Press. [Good anthology gathering classical texts in philosophy of science. Combines these primary literature reprints with commentaries summarizing the issues and providing background.] Q 175 P5129 1998